Savannah River NUCLEAR SOLUTIONS℠

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CEUS-SSC Project Status and Its Role in 10-YR PSHA Updates

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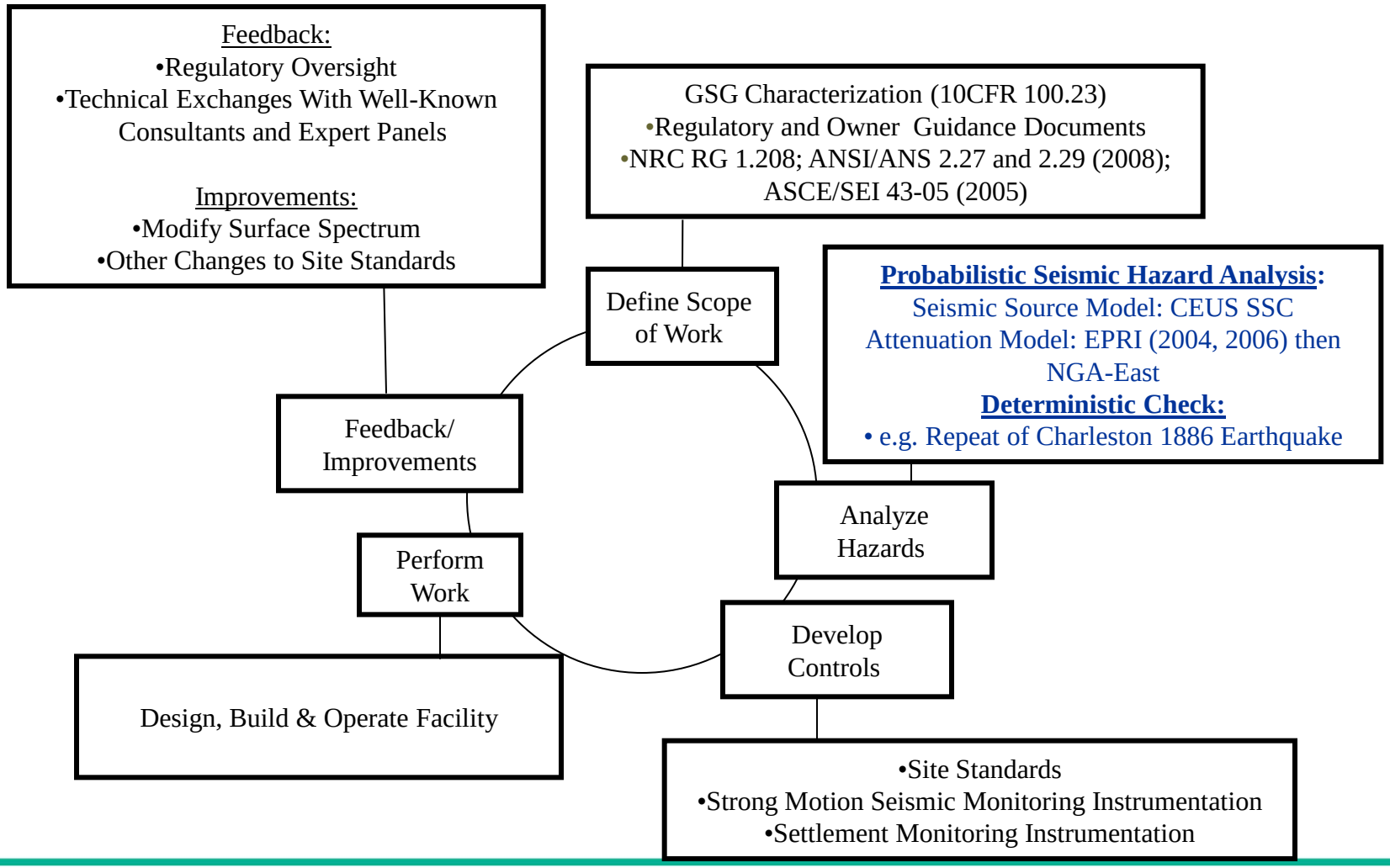
DOE Nuclear Safety Workshop

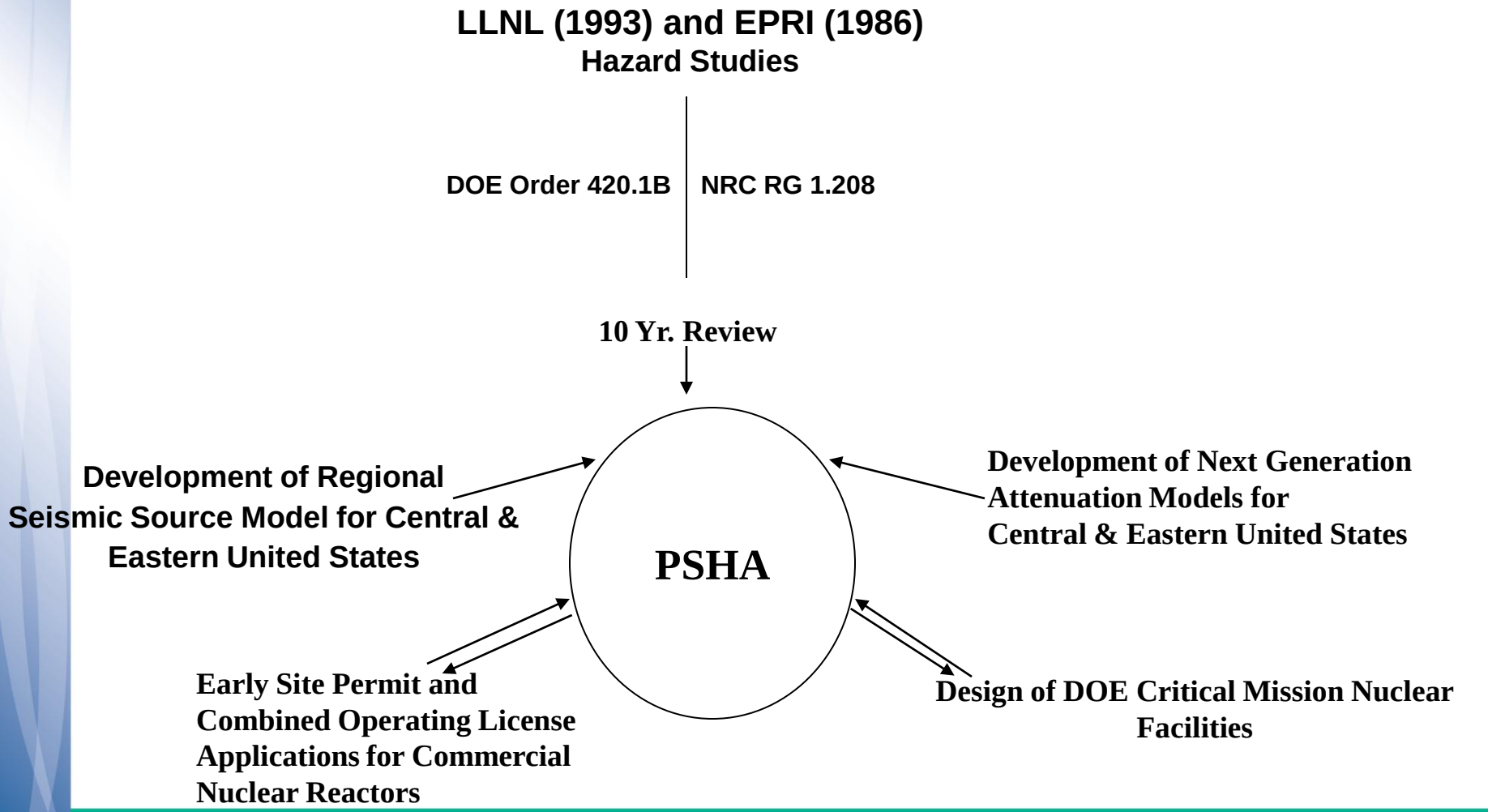
Disciplined, Systematic Approach to Seismic Safety



Review: Earthquake Characterization for CEUS

- **Probabilistic Seismic Hazard Analysis (PSHA) requires three elements:**
  - Earthquake source characterization
  - Ground motion attenuation models
  - Site Characterization and Parameterization for Site Response
- **Combined Operating License (COL) Applications require:**
  - Earthquake source characterization model and ground motion attenuation models to compute Site - Specific Ground Motion Response Spectrum (GMRS)
  - A Technology-Specific Certified Design Spectrum (Capacity) for comparison to the Site-Specific GMRS (Demand)
- **Current project is to provide the model for the first element for a PSHA for the CEUS**
  - Replace the EPRI (1989) and LLNL (1993) seismic source characterization models for the CEUS
  - Include uncertainties
  - Use SSHAC 3 process (NUREG/CR-6372):
    - **Evaluation** – Consider the data, models, and methods that have been proposed by the larger technical community
    - **Integration** – Represent the center, body and range of technically defensible interpretations
- **Ground motion attenuation models:**
  - EPRI attenuation models (2004, 2006) are available for use
  - NGA-East attenuation models scheduled for 2014

Industry-Government Partnership



SPONSORS' EXPECTATIONS

- Consistency
- Stability
- Greater Longevity
- Engagement of all Stakeholders
- Transparency
- Eliminate Delays

- Reduce Time

- Save Dollars

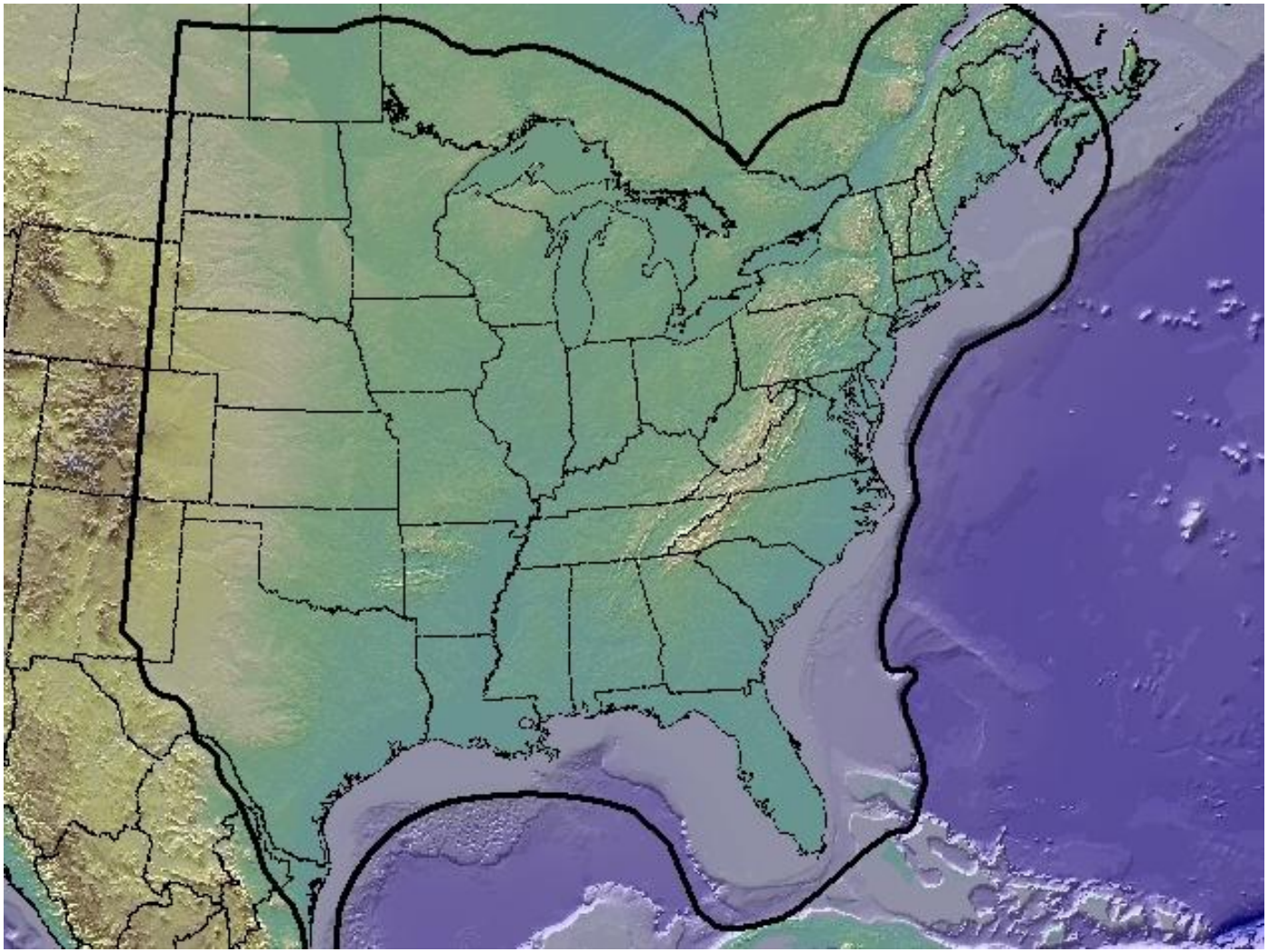
Summary of Projects

- **Central and Eastern United States (CEUS) Seismic Source Characterization (SSC) Project:** An industry-government partnership (EPRI, DOE Office of Nuclear Energy, DOE Office of the Chief of Nuclear Safety and NRC Office of Nuclear Regulatory Research) was formed to fund the development of a new seismic source model for the CEUS. The product from this national, landmark study will be a regional CEUS SSC model for use in a Probabilistic Seismic Hazard Analysis (PSHA) performed to meet DOE and NRC design requirements for nuclear facilities.

- **SRS PSHA Update Project:** a project established to comply with the 10-yr update requirement in DOE Order 420.1B. It will perform a Probabilistic Seismic Hazard Analysis (PSHA) for the Savannah River Site (SRS) appropriate for seismic design Category 3 through 5 nuclear facilities. Products from this project include seismic hazard curves and seismic response spectra to be used to meet DOE design requirements for nuclear facilities. Use of the findings from the CEUS SSC Project will result in significant cost savings for the Savannah River Site.

- **Next Generation Attenuation East (NGA-East) Project:** a project to develop a new ground motion characterization model for the Central and Eastern North-American (CENA) region. The products of the project are a set of new ground motion prediction equations (GMPEs), commonly known as attenuation relationships, and a set of associated logic-trees for use in a Probabilistic Seismic Hazard Analysis (PSHA).

CEUS Seismic Source Characterization Study Area



CEUS SSC Model Assessment: Test Sites

CEUS SSC PROJECT: CHRONOLOGY

- Complete Project Plan as EPRI Technical Update – June 2008 **(Completed)**
- Workshop #1: Significant Issues and Databases – July 21-23, 2008 **(Completed)**
- Workshop #2: Alternative Interpretations – February 18-20, 2009 **(Completed)**
- Workshop #3: Feedback on Sensitivity CEUS SSC Model – August 25-26, 2009 **(Completed)**
- Construct Draft CEUS SSC Model for Draft Technical Report – July 16, 2010 **(Completed)**
- Issue Draft Technical Report – July 31, 2010 **(Completed)**
- Begin Technical Assessment of Draft CEUS SSC Model – August 2, 2010
- Received Last PPRP Review Comments: September 24, 2010 **(Completed)**
- Received Last Stakeholder Comments – October 4, 2010 **(Completed)**

CEUS SSC PROJECT: CHRONOLOGY (continued)

- Complete Technical Assessment of Earthquake Catalog – March 2011 (Completed)
- Complete Technical Assessment for Earthquake Recurrence and Smoothing – June 2011
- Perform Hazard Calculations at Test Sites Using "Final" CEUS SSC Model – July 2011
- Complete EPRI Technical Report and Comment Resolution Tables for PPRP Review – August 2011
- PPRP Closure Briefing – September 2011
- Receive PPRP Final Letter Report – October 2011
- Provide CEUS SSC Technical Report to EPRI for publication – December 2011

Site-Specific Probabilistic Seismic Hazard Analysis

- The CEUS SSC Model can be used to perform a PSHA at any geographic location within the CEUS.
- The CEUS SSC Model is applicable at any point within the CEUS, subject to site-specific refinements required by facility-specific regulations or regulatory guidance.

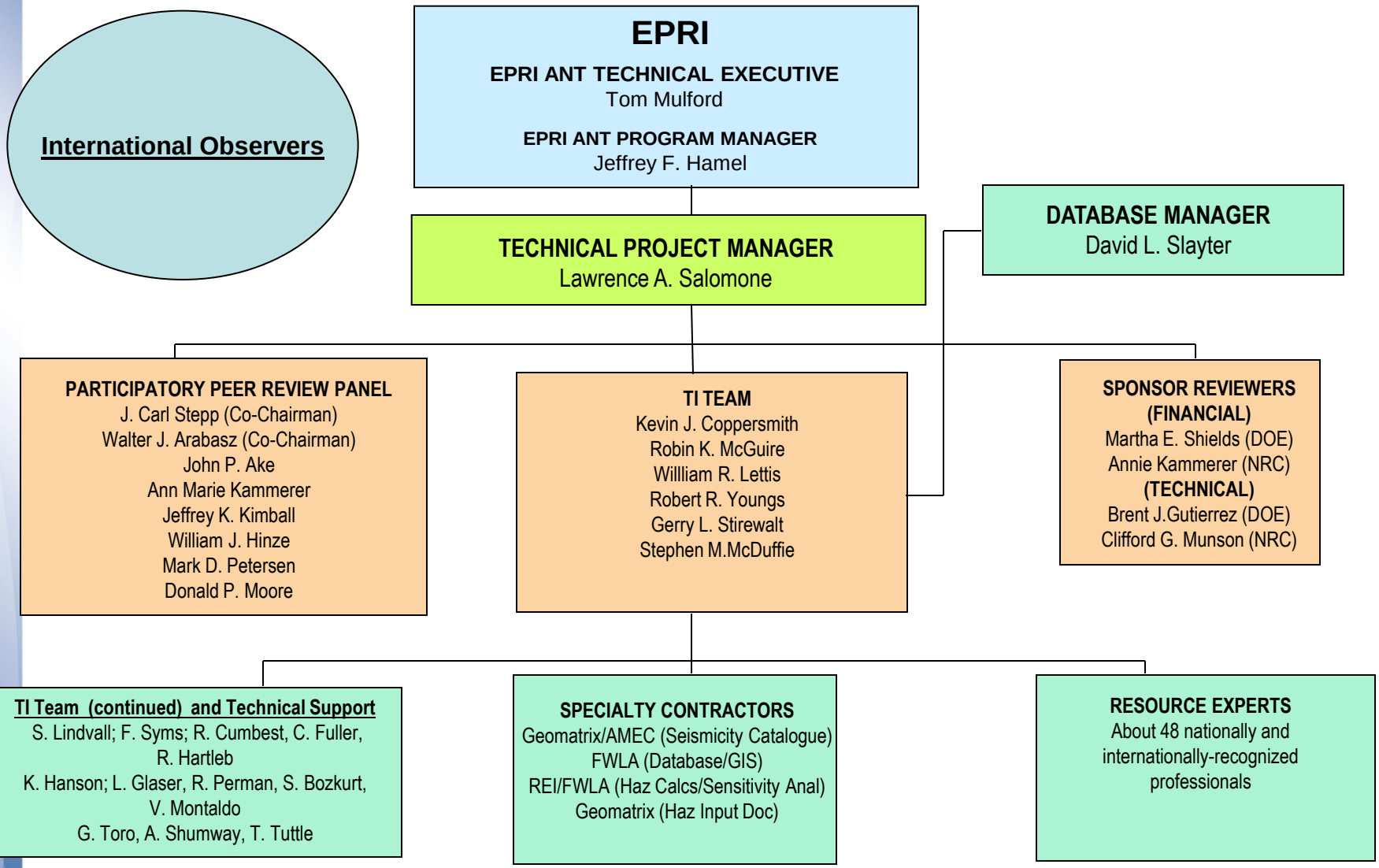
SRS PSHA Update Project

- **General Description of Services:** The subcontractor shall provide consulting services to update the PSHA for the Savannah River Site (SRS) appropriate for Seismic Design Category 3 through 5 nuclear facilities. A Seismic Hazards Report providing a seismic hazard curve for probabilities of exceedance 1 through 10^{-6} at spectral acceleration frequencies of 0.5Hz,1Hz, 2.5Hz, 5Hz, 10Hz, 25Hz and PGA (100Hz) and seismic design spectra utilizing a reference probability of 4×10^{-4} (2500 year RP) and 1×10^{-4} (10,000 year RP) shall be prepared that could be used for critical mission nuclear facilities at the Savannah River Site.

SRS PSHA UPDATE Project: Work Requirements (continued)

- **Work Requirements:**
  - Task Requirements:
    - *Compilation of Recent Information*
    - *Evaluation of Recent Information*
    - *Development of Preliminary Design Basis Earthquake (DBE) Ground Motion*
    - *Development of DBE Ground Motions*
    - *Surface Faulting*
    - *Report*
    - *Meetings*
    - *Participatory Peer Review Panel*
  - SRNS Furnished Material, Equipment or Services
  - Period of Performance/Schedule
  - Personnel Qualifications
  - Deliverables
  - Quality Assurance (QA) Requirements

CEUS SSC Project: Organization Chart



SRS PSHA Update Project: Organization Chart